For the above reasons, it seems very important that every attempt be made that either or both of the above experiments perform successfully. This does not necessarily imply that the experiments should be made as complete as one might possibly dream up. In other words, it would be important that they perform as reliably as possible since their failure would seriously effect the usefulness of the tests. Moreover, Bradbury pointed out that the cost of these experiments was greater than the cost of the active material and tritium. This would tend to caution one against added costly refinements ad infinitum.

There follows below a detailed discussion of the two experiments:

E. X-Ray Experiment.

York described the present thoughts concerning this experiment.

[redacted]

(1) [redacted] DOE b(3)

(2) [redacted]

(3) X-rays coming from the unperturbed outer surface of the tamper.

Since the X-ray experiment is a rather complicated one, it is possible that one will have to concentrate on only two of these spots. In that case, a measurement of spots 1 and 2 would be desirable.

[redacted] DOE b(3)

[redacted] DOE b(3)

[redacted] DOE b(3)

The second experiment may be perrormed sideways as indicated in detail below but the decision to do so will have to be based on more details and is to be made on June 2nd.

[redacted] DOE b(3)

DO
b(3

Figure 1 shows an outline of the experimental setup. The details of the downward experiment are as follows: The X-rays travel down the evacuated tube and hit an array of detectors at the bottom. These detectors perform the spectral resolution and may be of the simple crystal type. Offhand, it is not believed that the heating and evaporation of the tube close to the gadget will give rise to troubles. It is hoped that the bomb material will push into the tube sufficiently rapidly so that the X-rays detected will be those emitted from the hot bomb material. However, there is the possibility that if the shock arrives before the radiation it will heat such air as may have gotten into the evacuated tube and this air may give rise to spurious X-rays. This problem should be looked into in detail and it may be advisable to put some such low Z substance as graphite into the upper end of the tube as a filler.

DOE
b(3)

There was comment that such a large number might lead to failure because of the complicated setup. All sweeps are to be triggered from a central point. This central point may be actuated by two methods (a) have the first of the 8 detectors which responds actuate this central point or (b) put an extra detector in the system which is not connected with any scope but serves merely to actuate the central point. In any case, a duplicate system will be provided so that the chance of failure is reduced.

DOE
b(3)

More positive predictions concerning the range of temperatures to be expected might cut the number of detectors by as much as one half.

A block house (or ground shelter) built at the bottom of the tower will house the detectors, thus providing a very convenient experimental setup. The signals are transmitted from this block house to the scopes in the recording

because they must be multiply scattered gamma rays which have reversed their direction. The shielding material should be limonite concrete. Measurements at Oak Ridge for fission neutrons in equilibrium with fission gammas show that the 1/10th path for neutrons in this concrete is about 14 centimeters and that for gamma rays about 20 centimeters.

At present it is planned to place 6 magnets within the shielding. It is planned that the measurement be performed at 2 energies, namely about 7 million and 14 million volts. The extra factor of 3 is compounded of a safety factor and the necessary sensitivity range. This sensitivity range is covered in part by the scopes (factor 20) but in part it will have to be made up by having additional channels available.

Ideally, one would hope to adjust the range of sensitivity such that one would get a record such as that indicated in Figure 4.

Figure 4

DOE b(3)

The accuracy before point A would not have to be very good since we are not intending to accomplish objective 2. However, it is very desirable to have a record of point A itself in order to know that the equipment was really working properly and is in fact recording the sudden burst due to the DT neutrons. The suggestion was made that it was somewhat of a luxury to measure point B accurately and that one might decrease the range by letting the equipment saturate. The disadvantage of such an arrangement is that the equipment may not recover sufficiently quickly to record point C and the subsequent events truthfully. It would indeed be interesting to record the latter. It may be possible to reduce the number of channels by placing less emphasis on the region below A.

DOE b(3)

DO b(3

Some discussion ensued about the most likely energy level at which point A would

FIG. 2
SIDEWAYS X-RAY EXPERIMENT